Empowered by Innovation NEC

NEC EXPRESS5800/R120b-1
Configuration Guide

Introduction

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC EXPRESS5800 server.

September 2011
Revision 5.2
NEC Corporation

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Technical Specification

Key Features

- High performance with the latest Intel® Xeon® processor 5600 series
- Up to 192 GB of high speed DDR3-1333 memory
- High energy efficiency with power capping feature and 80 PLUS® Gold power supply
- Full manageability by integrated EXPRESSSCOPE Engine 2

Specification

2.5-inch Drive Model (1 / 2)

Model		R120b-1			
Part Number		N8100-1717F	N8100-1718F	N8100-1719F	N8100-1720F
Processor	**Type**	Intel® Xeon® processor E5606	Intel® Xeon® processor E5620	Intel® Xeon® processor E5645	Intel® Xeon® processor L5640
	Clock Speed	2.13 GHz	2.40 GHz	2.40 GHz	2.26 GHz
	Number of Processors	1 or 2			
	Cache	8 MB	12 MB	12 MB	12 MB
	Cores and Threads	4C-4T	4C-8T	6C-12T	6C-12T
Chipset		Intel® 5520 Chipset			
Memory	**Type**	DDR3-1333 and DDR3-1066 ECC Registered Low Power DIMM			
	Standard Capacity	0 GB			
	Maximum Capacity	192 GB (12 x 16 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	**Standard Capacity**	0 GB			
	Maximum Capacity	SAS : 5.4 TB (6 x 900 GB) SATA : 6 TB (6 x 1 TB) SSD : 600 GB (6 x 100 GB)			
	Disk Controller	SATA : 3Gb/s (Integrated) SAS: 6Gb/s (Optional)			
	RAID	SATA : RAID 0/1/5/6/10/50 (Optional) SAS : RAID 0/1/5/6/10/50 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Floppy Disk Drive	Optional			
	Optical Drive Bays [free]	1 [1]			
	Floppy Drive Bays [free]	0 [0]			
	Disk Drive Bays [free]	6 [6]			
Expansion Slots [free]	**Standard**	Total: 3 slots available 1[1] x PCIe 2.0 x16 (x16 connector) 1[1] x PCIe 2.0 x8 (x8 connector) 1[1] x PCIe 2.0 x4 (x8 connector) dedicated RAID slot			
	Optional Riser Card (N8116-23)	Total: 3 slots available 1[1] x PCIe 2.0 x8 (x8 connector) 1[1] x 64-bit/ 133 MHz PCI-X 1[1] x PCIe 2.0 x4 (x8 connector) dedicated RAID slot			

Model		R120b-1			
Video Controller (VRAM)		Integrated in Server Management Controller (32MB)			
Interfaces		1 x Keyboard (6-pin mini DIN, 1 x rear) 1 x Mouse (6-pin mini DIN, 1 x rear) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 x Serial (9-pin mini D-sub, RS232-C, Serial B, 1 x rear) 8 x USB2.0 (2 x front, 2 x rear, 4 x internal) 2 x 1000BASE-T LAN connector (1000BASE-T / 100BASE-TX / 10BASE-T, RJ-45, 2 x rear) 1 x Management LAN connector (100BASE-TX / 10BASE-T, RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 2			
Redundant Fan		Standard, non-hot plug			
Redundant Power Supply		Optional, hot plug			
Power Supply		1-2 x 650 Watt 80 PLUS® Gold certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	**(Max. Config, Idling)**	245 VA / 243 Watt	244 VA / 242 Watt	244 VA / 242 Watt	244 VA / 242 Watt
	(Max. Config, Operating)	470 VA / 460 Watt	500 VA / 490 Watt	510 VA / 500 Watt	480 VA / 470 Watt
Acoustical Noise (Sound Pressure Level) [1]	**Max. Config, Idling**	49.0 dB			
	Max. Config, Operating	54.6 dB			
Dimensions (W x D x H)		427.5 x 722.0 x 43.5 mm / 16.8 x 28.4 x 1.7 in (1U)			
Weight (Minimum / Maximum)		16 kg / 21 kg, 35.27 lbs. / 46.30 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 35° C / 50° to 95° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, CE, BSMI, CCC, UL, CB, RoHS, WEEE			
Operating Systems		Microsoft® Windows Server® 2003, Standard Edition (SP1 or later) Microsoft® Windows Server® 2003, Enterprise Edition (SP1 or later) Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Red Hat Enterprise Linux ES4.8 or later (x86) [2] Red Hat Enterprise Linux ES4.8 or later (EM64T) [2] Red Hat Enterprise Linux AS4.8 or later (x86) [2] Red Hat Enterprise Linux AS4.8 or later (EM64T) [2] Red Hat Enterprise Linux 5.4 or later (x86) [2] Red Hat Enterprise Linux 5.4 or later (EM64T) [2] Red Hat Enterprise Linux Advanced Platform5.4 or later (x86) [2] Red Hat Enterprise Linux Advanced Platform5.4 or later (EM64T) [2] Red Hat Enterprise Linux 6.0 or later (x86) [2] Red Hat Enterprise Linux 6.0 or later (x86_64) [2] SUSE Linux Enterprise Server 10 [2] SUSE Linux Enterprise Server 10 (EM64T) [2] SUSE Linux Enterprise Server 11 SP1 or later (EM64T) [2] VMware ESXi 4.1			

[1] Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

[2] For Linux support, contact our sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

2.5-inch Drive Model (2 / 2)

Model		R120b-1		
Part Number		N8100-1721F	N8100-1722F	N8100-1723F
Processor	**Type**	Intel® Xeon® processor x5650	Intel® Xeon® processor X5675	Intel® Xeon® processor X5690
	Clock speed	2.66 GHz	3.06 GHz	3.46 GHz
	Number of Processors	1 or 2		
	Cache	12 MB		
	Cores and Threads	6C-12T		
Chipset		Intel® 5520 Chipset		
Memory	**Type**	DDR3-1333 and DDR3-1066 ECC Registered Low Power DIMM		
	Standard Capacity	0 GB		
	Maximum Capacity	192 GB (12 x 16 GB)		
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing		
Internal Storage	**Standard Capacity**	0 GB		
	Maximum Capacity	SAS : 5.4 TB (6 x 900 GB) SATA : 6 TB (6 x 1 TB) SSD : 600 GB (6 x 100 GB)		
	Disk Controller	SATA : 3Gb/s (Integrated) SAS: 6Gb/s (Optional)		
	RAID	SATA : RAID 0/1/5/6/10/50 (Optional) SAS : RAID 0/1/5/6/10/50 (Optional)		
	Hot Plug	Supported		
	Optical Disk Drive	Optional		
	Floppy Disk Drive	Optional		
	Optical Drive Bays [free]	1 [1]		
	Floppy Drive Bays [free]	0 [0]		
	Disk Drive Bays [free]	6 [6]		
Expansion Slots [free]	**Standard**	Total: 3 slots available 1 [1] x PCIe 2.0 x16 (x16 connector) 1 [1] x PCIe 2.0 x8 (x8 connector) 1 [1] x PCIe 2.0 x4 (x8 connector) dedicated RAID slot		
	Optional Riser Card (N8116-23)	Total: 3 slots available 1 [1] x PCIe 2.0 x8 (x8 connector) 1 [1] x 64-bit/ 133 MHz PCI-X 1 [1] x PCIe 2.0 x4 (x8 connector) dedicated RAID slot		
Video Controller (VRAM)		Integrated in Server Management Controller (32MB)		
Interfaces		1 x Keyboard (6-pin mini DIN, 1 x rear) 1 x Mouse (6-pin mini DIN, 1 x rear) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 x Serial (9-pin mini D-sub, RS232-C, Serial B, 1 x rear) 8 x USB2.0 (2 x front, 2 x rear, 4 x internal) 2 x 1000BASE-T LAN connector (1000BASE-T / 100BASE-TX / 10BASE-T, RJ-45, 2 x rear) 1 x Management LAN connector (100BASE-TX / 10BASE-T, RJ-45, 1 x rear)		

Model		R120b-1		
Server Management		EXPRESSSCOPE Engine 2		
Redundant Fan		Standard, non-hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1-2 x 750 Watt 80 PLUS® Gold certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		
Power Consumption	**(Max. Config, Idling)**	252 VA / 250 Watt	252 VA / 250 Watt	257 VA / 255 Watt
	(Max. Config, Operating)	580 VA / 570 Watt	580 VA / 570 Watt	710 VA / 700 Watt
Acoustical Noise (Sound Pressure Level) [1]	**Max. Config, Idling**	49.7 dB		
	Max. Config, Operating	54.7 dB		
Dimensions (W x D x H)		427.5 x 722.0 x 43.5 mm / 16.8 x 28.4 x 1.7 in (1U)		
Weight (Minimum / Maximum)		16 kg / 21 kg, 35.27 lbs. / 46.30 lbs.		
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 35° C / 50° to 95° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%		
Regulatory and Safety		FCC, CE, BSMI, CCC, UL, CB, RoHS, WEEE		
Operating Systems		Microsoft® Windows Server® 2003, Standard Edition (SP1 or later) Microsoft® Windows Server® 2003, Enterprise Edition (SP1 or later) Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Red Hat Enterprise Linux ES4.8 or later (x86) [2] Red Hat Enterprise Linux ES4.8 or later (EM64T) [2] Red Hat Enterprise Linux AS4.8 or later (x86) [2] Red Hat Enterprise Linux AS4.8 or later (EM64T) [2] Red Hat Enterprise Linux 5.4 or later (x86) [2] Red Hat Enterprise Linux 5.4 or later (EM64T) [2] Red Hat Enterprise Linux Advanced Platform5.4 or later (x86) [2] Red Hat Enterprise Linux Advanced Platform5.4 or later (EM64T) [2] Red Hat Enterprise Linux 6.0 or later (x86) [2] Red Hat Enterprise Linux 6.0 or later (x86_64) [2] SUSE Linux Enterprise Server 10 [2] SUSE Linux Enterprise Server 10 (EM64T) [2] SUSE Linux Enterprise Server 11 SP1 or later (EM64T) [2] VMware ESXi 4.1		

[1] Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

[2] For Linux support, contact our sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

3.5-inch Drive Model

Model		R120b-1		
Part Number		N8100-1724F	N8100-1725F	N8100-1726F
Processor	**Type**	Intel® Xeon® processor E5606	Intel® Xeon® processor E5620	Intel® Xeon® processor X5650
	Clock speed	2.13 GHz	2.40 GHz	2.66 GHz
	Number of Processors	1 or 2		
	Cache	8 MB	12 MB	12 MB
	Cores and Threads	4C-4T	4C-8T	6C-12T
Chipset		Intel® 5520 Chipset		
Memory	**Type**	DDR3-1333 and DDR3-1066 ECC Registered Low Power DIMM		
	Standard Capacity	0 MB		
	Maximum Capacity	192 MB (12 x 16 GB)		
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing		
Internal Storage	**Standard Capacity**	0 GB		
	Maximum Capacity	SATA : 6 TB (3 x 2 TB)		
	Disk Controller	SATA : 3 Gb/s (Integrated)		
	RAID	SATA : RAID 0/1/10 [1 2] (Standard), RAID 5/6/50 (Optional)		
	Hot Plug	Supported		
	Optical Disk Drive	Optional		
	Floppy Drive	Optional		
	Optical Drive Bays [free]	1 [1]		
	Floppy Drive Bays [free]	1 [1]		
	Disk Drive Bays [free]	3 [3]		
Expansion Slots [free]	**Standard**	Total: 3 slots available 1 [1] x PCIe 2.0 x16 (x16 connector) 1 [1] x PCIe 2.0 x8 (x8 connector) 1 [1] x PCIe 2.0 x4 (x8 connector) dedicated RAID slot		
	Optional Riser Card (N8116-23)	Total: 3 slots available 1 [1] x PCIe 2.0 x8 (x8 connector) 1 [1] x 64-bit/ 133 MHz PCI-X 1 [1] x PCIe 2.0 x4 (x8 connector) dedicated RAID slot		
Video Controller (VRAM)		Integrated in Server Management Controller (32MB)		
Interfaces		1 x Keyboard (6-pin mini DIN, 1 x rear) 1 x Mouse (6-pin mini DIN, 1 x rear) 2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 1 x Serial (9-pin mini D-sub, RS232-C, Serial B, 1 x rear) 8 x USB2.0 (2 x front, 2 x rear, 4 x internal) 2 x 1000BASE-T LAN connector (1000BASE-T / 100BASE-TX / 10BASE-T, RJ-45, 2 x rear) 1 x Management LAN connector (100BASE-TX / 10BASE-T, RJ-45, 1 x rear)		
Server Management		EXPRESSSCOPE Engine 2		
Redundant Fan		Standard, non-hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1-2 x 750 Watt 80 PLUS® Gold certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		

Model		R120b-1		
Power Consumption	**(Max. Config, Idling)**	240 VA / 238 Watt	229 VA / 227 Watt	239 VA / 237 Watt
	(Max. Config, Operating)	490 VA / 480 Watt	520 VA / 510 Watt	620 VA / 610 Watt
Acoustical Noise (Sound Pressure Level) [2]	**Max. Config, Idling**	49.0 dB	49.0 dB	49.7 dB
	Max. Config, Operating	54.6 dB	54.6 dB	54.7 dB
Dimensions (W x D x H)		427.5 x 722.0 x 43.5 mm / 16.8 x 28.4 x 1.7 in (1U)		
Weight (Minimum / Maximum)		16 kg / 21 kg, 35.27 lbs. / 46.30 lbs.		
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 35° C / 50° to 95° F, 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%		
Regulatory and Safety		FCC, CE, BSMI, CCC, UL, CB, RoHS, WEEE		
Operating Systems		Microsoft® Windows Server® 2003, Standard Edition (SP1 or later) Microsoft® Windows Server® 2003, Enterprise Edition (SP1 or later) Microsoft® Windows Server® 2003 R2, Standard Edition Microsoft® Windows Server® 2003 R2, Enterprise Edition Microsoft® Windows Server® 2003 R2, Standard x64 Edition Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Red Hat Enterprise Linux ES4.8 or later (x86) [4] Red Hat Enterprise Linux ES4.8 or later (EM64T) [4] Red Hat Enterprise Linux AS4.8 or later (x86) [4] Red Hat Enterprise Linux AS4.8 or later (EM64T) [4] Red Hat Enterprise Linux 5.4 or later (x86) [4] Red Hat Enterprise Linux 5.4 or later (EM64T) [4] Red Hat Enterprise Linux Advanced Platform5.4 or later (x86) [4] Red Hat Enterprise Linux Advanced Platform5.4 or later (EM64T) [4] Red Hat Enterprise Linux 6.0 or later (x86) [4] Red Hat Enterprise Linux 6.0 or later (x86_64) [4] SUSE Linux Enterprise Server 10 [4] SUSE Linux Enterprise Server 10 (EM64T) [4] SUSE Linux Enterprise Server 11 SP1 or later (EM64T) [4] VMware ESXi 4.1		

1 On-board SATA RAID controller is supported only on Windows operating systems.

2 On-board SATA RAID controller does not support RAID 10 configured with 2TB HDDs.

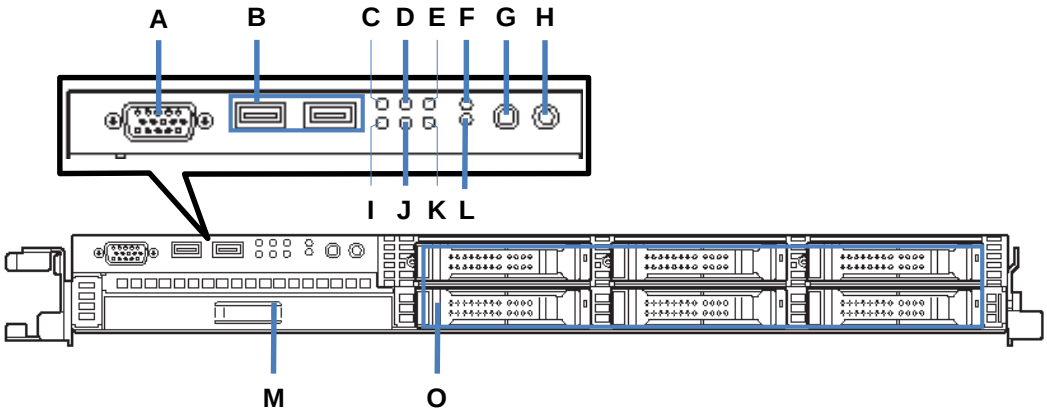
3 Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

4 For Linux support, contact our sales representative or go to the NEC website at: http://www.nec.com/global/prod/express/linux/index.html

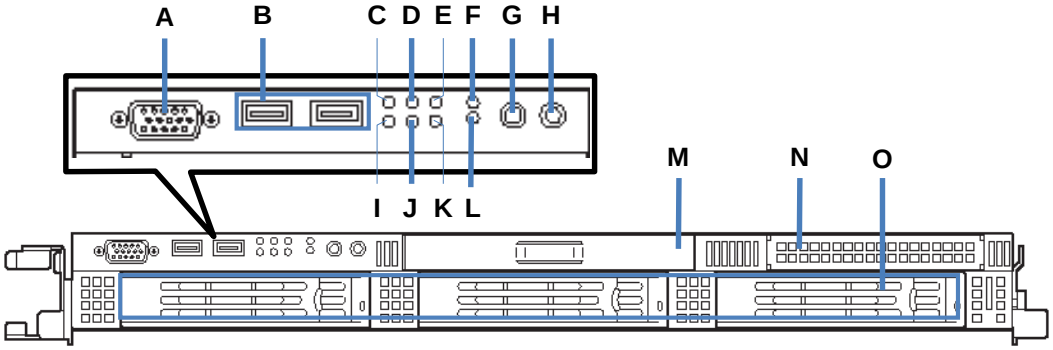
External Views

Front and Rear Views

Front View for 2.5-inch Drive Model

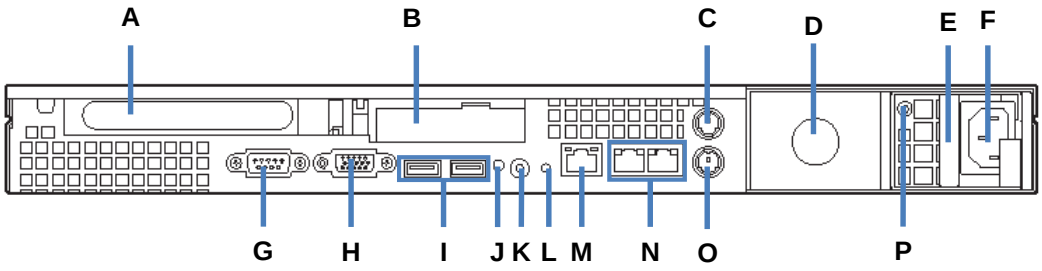


Front View for 3.5-inch Drive Model



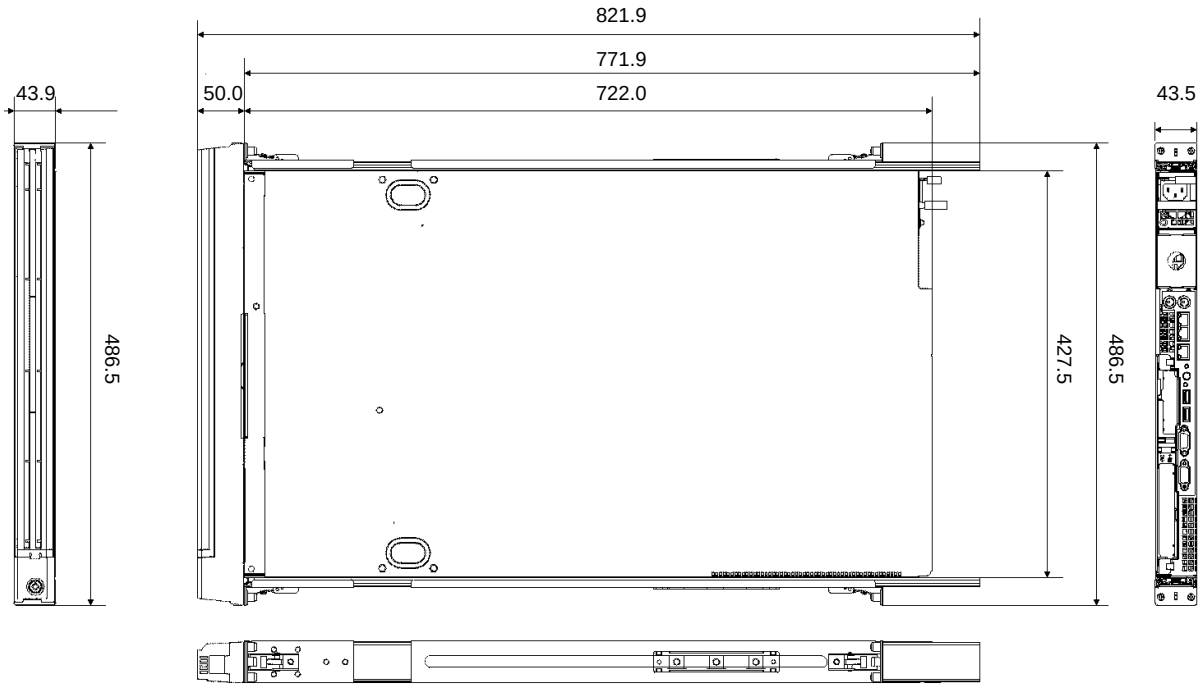
Legend			
A.	VGA Connector	**I.**	Hard Drive Activity LED
B.	USB Connectors	**J.**	Data LAN 2 Activity LED
C.	Power LED	**K.**	System Status LED
D.	Data LAN 1 Activity LED	**L.**	Dump (NMI) Switch
E.	UID LED	**M.**	Optical Drive Bay
F.	System Reset Switch	**N.**	Floppy Drive Bay
G.	Power Button	**O.**	Drive Bays
H.	UID LED Button		

Rear View



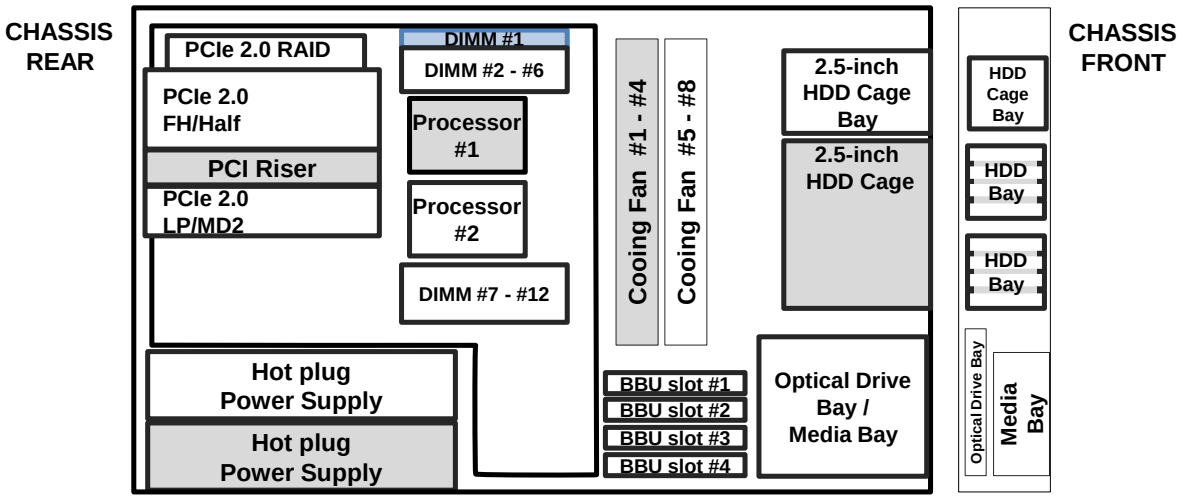
Legend			
A.	PCI Slots (Full-Height)	**I.**	USB Connectors
B.	PCI Slots (Low-Profile)	**J.**	UID Button
C.	Mouse Connector	**K.**	UID LED
D.	Additional PS Slot	**L.**	Dump (NMI) Switch
E.	Power Supply	**M.**	Management LAN Connector
F.	AC Inlet	**N.**	Data LAN Connectors
G.	Serial Port Connector	**O.**	Keyboard Connector
H.	VGA Connector	**P.**	AC Power LED

Dimensions (mm)



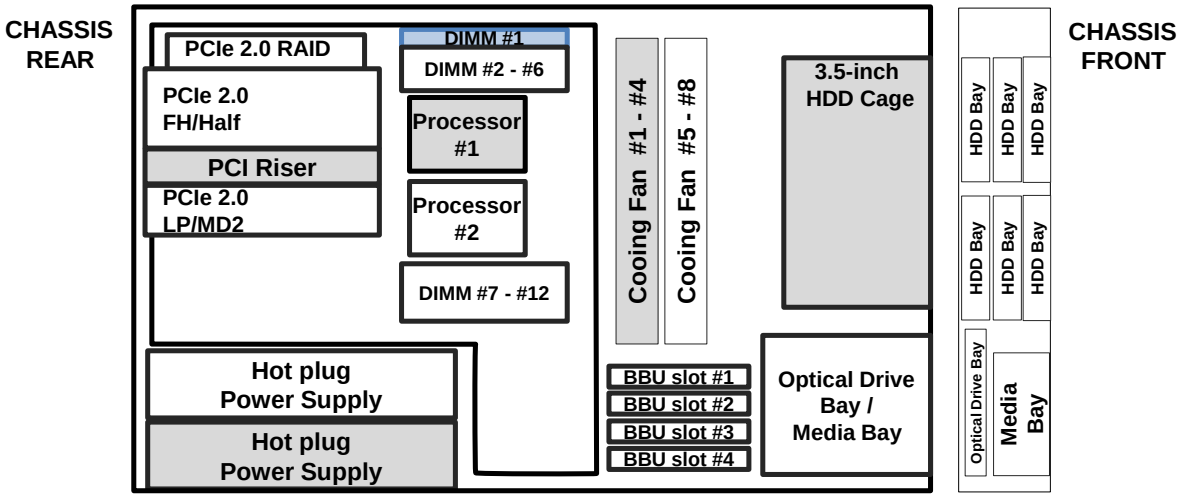
Configuration Diagram

2.5-inch Drive Model



Legend: Minimum required components Standard components

3.5-inch Drive Model



Legend: Minimum required components Standard components

Server Configuration

1 Base Models

2.5-inch Drive Model

Product Name / Description	Part Number
NEC EXPRESS5800/R120b-1 Server (4C/E5606) no RAM, no 2.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor E5606, 2.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1717F
NEC EXPRESS5800/R120b-1 Server (4C/E5620) no RAM, no 2.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor E5620, 2.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1718F
NEC EXPRESS5800/R120b-1 Server (6C/E5645) no RAM, no 2.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor E5645, 2.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1719F
NEC EXPRESS5800/R120b-1 Server (6C/L5640) no RAM, no 2.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor X5687, 2.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1720F
NEC EXPRESS5800/R120b-1 Server (6C/X5650) no RAM, no 2.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor X5650, 2.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1721F
NEC EXPRESS5800/R120b-1 Server (6C/X5675) no RAM, no 2.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor X5675, 2.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1722F
NEC EXPRESS5800/R120b-1 Server (6C/X5690) no RAM, no 2.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor X5690, 2.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1723F

3.5-inch Drive Model

Product Name / Description	Part Number
NEC EXPRESS5800/R120b-1 Server (4C/ E5606) no RAM, no 3.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor E5606, 3.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1724F
NEC EXPRESS5800/R120b-1 Server (4C/E5620) no RAM, no 3.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor E5620, 3.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1725F
NEC EXPRESS5800/R120b-1 Server (6C/X5650) no RAM, no 3.5-inch HDD, no ODD, no FDD Including: 1 x Intel Xeon processor X5650, 3.5-inch HDD Cage, EXPRESSBUILDER DVD	N8100-1726F

2 2nd Processor

Available sockets: 1

Product Name / Description	Part Number
CPU Kit (4C/E5606) Intel® Xeon® Processor E5606 (2.13 GHz / 4C-4T / 8 MB)	N8101-489F
CPU Kit (4C/E5620) Intel® Xeon® Processor E5620 (2.40 GHz / 4C-8T / 12 MB)	N8101-465F
CPU Kit (6C/E5645) Intel® Xeon® Processor E5645 (2.40 GHz / 6C-12T / 12 MB)	N8101-490F
CPU Kit (6C/L5640) Intel® Xeon® Processor L5640 (2.26 GHz / 6C-12T / 12 MB)	N8101-467F
CPU Kit (6C/X5650) Intel® Xeon® Processor X5650 (2.66 GHz / 6C-12T / 12 MB)	N8101-491F
CPU Kit (6C/X5675) Intel® Xeon® Processor X5675 (3.06 GHz / 6C-12T / 12 MB)	N8101-492F
CPU Kit (6C/X5690) Intel® Xeon® Processor X5690 (3.46 GHz / 6C-12T / 12 MB)	N8101-493F

NOTE:

- The 2nd processor must be the same with what is used in the base model

3 Memory

3.1 Memory Configuration

Refer to the section in accordance with your memory configuration:

- Independent Channel / Memory Sparing Configuration: Refer to 3.1.1
- Memory Mirroring / Memory Lockstep Configuration: Refer to 3.1.2

3.1.1 Independent Channel / Memory Sparing Configuration

Available slots: 6 per processor

Product Name / Description	Part Number
Additional 1GB Memory Module (1x 1GB) 1 GB (1 x 1 GB) DDR3-1333 ECC Registered Low Power DIMM	N8102-371F
Additional 2GB Memory Module (1x 2GB) 2 GB (1 x 2 GB) DDR3-1333 ECC Registered Low Power DIMM	N8102-372F
Additional 4GB Memory Module (1x 4GB) 4 GB (1 x 4 GB) DDR3-1333 ECC Registered Low Power DIMM	N8102-373F
Additional 8GB Memory Module (1x 8GB) 8 GB (1 x 8 GB) DDR3-1333 ECC Registered Low Power DIMM	N8102-374F
Additional 8GB Memory Module (1x 16GB) 16 GB (1 x 16 GB) DDR3-1066 ECC Registered Low Power DIMM	N8102-375F

NOTE:

- Minimum one memory kit per processor must be installed.
- It is recommended to install two or three identical memory kits for dual-channel or triple-channel symmetric memory configurations to increase memory transfer speed.

3.1.2 Memory Mirroring / Memory Lockstep Configuration

Available slots: 4 per processor

Product Name / Description	Part Number
Additional 2GB Memory Module (2x 1GB) 2 GB (2 x 1 GB) DDR3-1333 ECC Registered Low Power DIMM	N8102-387
Additional 4GB Memory Module (2x 2GB) 4 GB (2 x 2 GB) DDR3-1333 ECC Registered Low Power DIMM	N8102-388
Additional 8GB Memory Module (2x 4GB) 8 GB (2 x 4 GB) DDR3-1333 ECC Registered Low Power DIMM	N8102-389
Additional 16GB Memory Module (2x 8GB) 16 GB (2 x 8 GB) DDR3-1333 ECC Registered Low Power DIMM	N8102-390
Additional 32GB Memory Module (2x 16GB) 32 GB (2 x 16 GB) DDR3-1066 ECC Registered Low Power DIMM	N8102-391

NOTE:

- Minimum one memory kit per processor must be installed.

Memory Configuration Feature Comparison

See the table below for feature comparisons of memory configurations supported.

	Independent Channel	Memory Sparing	Memory Lockstep	Memory Mirroring
Performance	Best	Better	Better	Good
Data Protection	No	Multiple single bit error protection	No	Multiple single bit and multi bit error protection
Data Correction	ECC, x4 SDDC	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
Redundancy	No	Partly	No	Fully
Available Memory	Full physical memory	Physical memory excluding spare memory	Full physical memory	Half physical memory
Available Memory Channels	3	3	2	2
Notes	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

Maximum Memory Speed

See the table below for the actual maximum memory speed on your system.

DDR3 memory speed depends on the type of DIMMs and the native memory bus speed of the memory controller. All memory buses operate at the clock frequency of the DIMM with the lowest frequency.

Processor Type	Populated DIMMs	Memory Power Setting	DIMMs per Channel	DIMM Speed
E5606 E5620	1 GB, 2 GB, 4 GB, 8 GB	-	-	1066 MHz
	16GB	Normal (1.5V)	1	1066 MHz
			2	800 MHz
		Low (1.35V)	-	800 MHz
E5645 L5640 X5650 X5675 X5690	1 GB, 2 GB, 4 GB, 8 GB	Normal (1.5V)	-	1333 MHz
		Low (1.35V)	1	1333 MHz
			2	1066 MHz
	16GB	Normal (1.5V)	1	1066 MHz
			2	800 MHz
		Low (1.35V)	-	800 MHz

Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

Maximum Memory Size Supported by OS		Maximum Available Memory
4 GB	Microsoft Windows Server 2003, Standard Edition(SP1) Microsoft Windows Server 2003 R2, Standard Edition Microsoft Windows Server 2008 Standard	**4 GB (HW-DEP enabled)** **App. 3.6 GB (HW-DEP disabled)**
32 GB	Microsoft Windows Server 2003 R2, Standard x64 Edition Microsoft Windows Server 2008 Standard (x64) Microsoft Windows Server 2008 R2 Standard (x64)	**32 GB**
64 GB	Microsoft Windows Server 2003, Enterprise Edition(SP1) Microsoft Windows Server 2003 R2, Enterprise Edition Microsoft Windows Server 2008 Enterprise	**64 GB**
1 TB	Microsoft Windows Server 2003 R2, Enterprise x64 Edition	**192 GB**
2 TB	Microsoft Windows Server 2008 Enterprise (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	**192 GB**
16 GB	Red Hat Enterprise Linux ES4 Red Hat Enterprise Linux ES4 (EM64T) Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 5 Advanced Platform Red Hat Enterprise Linux 6 SUSE Linux Enterprise Server 10 SUSE Linux Enterprise Server 11	**16 GB**
64 GB	Red Hat Enterprise Linux AS4	**64 GB**
256 GB	Red Hat Enterprise Linux AS4 (EM64T) Red Hat Enterprise Linux 5 (EM64T) Red Hat Enterprise Linux 5 Advanced Platform (EM64T)	**192 GB**
2 TB	Red Hat Enterprise Linux 6.0 (x86_64)	**192 GB**
512 GB	SUSE Linux Enterprise Server 10 (EM64T) SUSE Linux Enterprise Server 11 (EM64T)	**192 GB**
256 GB or 1TB [1]	VMware ESXi 4.1	**192 GB**

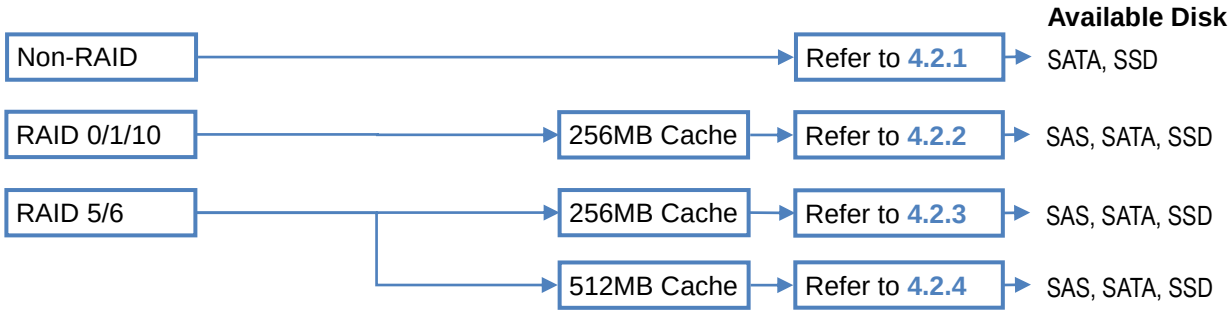
[1] Up to 255 GB of main memory is available to each virtual machine.

4 Internal Hard Disk Drives

4.1 RAID Configuration

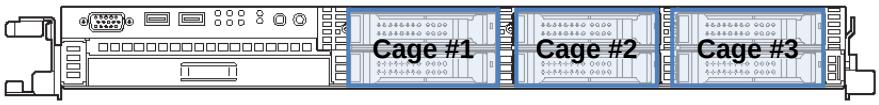
Refer to the section in accordance with your disk form factor and RAID configuration.

4.1.1 2.5-inch Drives

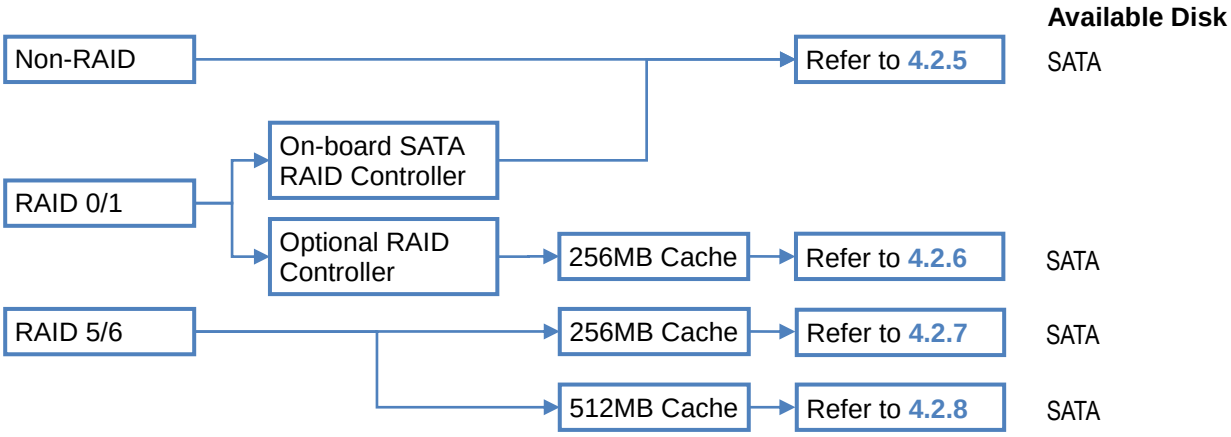


NOTE:

- Up to four hard drives can be installed in the on-board SATA configuration.
- Hot plug insertion/removal is not supported with the on-board SATA non-RAID controller.
- An optional RAID controller occupies one PCI slot.
- All hard drives within a RAID array should be of the same capacity and rotation speed.
- SAS and SATA hard drives must be installed in separate HDD Cages.



4.1.2 3.5-inch Drives



NOTE:

- On-board SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- On-board SATA RAID Controller does not support RAID 10 configured with 2TB HDDs.
- Hot plug insertion/removal is not supported with the on-board SATA non-RAID controller.
- All hard drives within a RAID array should be of the same capacity.
- An optional RAID controller occupies one PCI slot.

4.2 Internal Drive Configuration

4.2.1 2.5-inch Drives with On-board SATA Controller

Category		Product Name / Description	Part Number
Storage Controller		**On-board SATA Controller** 1 x mini-SAS port	(Standard)
Cable		**Internal SATA Cable** 1 x mini-SAS to 1 x mini-SAS	(Standard)
HDD Cage		**2.5-inch HDD Cage** 6 x 2.5-inch Hot-plug hard drive bays	(Standard)
HDD **4 slots available**	**SATA**	**160GB HDD** 1 x 160 GB, 2.5-inch, SATA2, 7,200 rpm	N8150-276
		500GB HDD 1 x 500 GB, 2.5-inch, SATA2, 7,200 rpm	N8150-277
		1TB HDD 1 x 1 TB, 2.5-inch, SATA2, 7,200 rpm	N8150-334
	SSD	**50GB SSD** 1 x 50 GB, 2.5-inch, SATA2	N8150-702
		100GB SSD 1 x 100 GB, 2.5-inch, SATA2	N8150-707

NOTE:

- Up to four hard drives can be installed in the configuration.
- Hot plug insertion/removal is not supported with the on-board SATA non-RAID controller.

4.2.2 2.5-inch Drives with RAID 0/1 Controller with 256 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (256MB, RAID 0/1)** LSI MegaRAID SAS 9264-8i RAID 0/1, 256MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 3Gb/s, LP / FH	N8103-129
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9264	N8103-124
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
HDD Cage		**2.5-inch HDD Cage** 6 x 2.5-inch hot plug hard drive bays	(Standard)
HDD 6 slots available	**SAS**	**146.5GB HDD** 1 x 146.5 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-300
		300GB HDD 1 x 300 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1 x 450 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1 x 600 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1 x 900 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1 x 73.2 GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1 x 146.5 GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1 x 300GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-331
	SATA	**160GB HDD** 1 x 160 GB, 2.5-inch, SATA2, 7,200 rpm	N8150-276
		500GB HDD 1 x 500 GB, 2.5-inch, SATA2, 7,200 rpm	N8150-277
		1TB HDD 1 x 1 TB, 2.5-inch, SATA2, 7,200 rpm	N8150-334
	SSD	**50GB SSD** 1 x 50 GB, 2.5-inch, SATA2	N8150-702
		100GB SSD 1 x 100 GB, 2.5-inch, SATA2	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- SAS and SATA hard drives must be installed in separate HDD Cages.

4.2.3 2.5-inch Drives with RAID 5/6 Controller with 256 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (256MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9264-8i RAID 0/1/5/6, 256MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 3Gb/s, LP / FH	N8103-130
RAID BBU Recommended		**RAID Battery Backup Unit** for LSI MegaRAID SAS 9264	N8103-124
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
HDD Cage		**2.5-inch HDD Cage** 6 x 2.5-inch hot plug hard drive bays	(Standard)
HDD 6 slots available	**SAS**	**146.5GB HDD** 1 x 146.5 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-300
		300GB HDD 1 x 300 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1 x 450 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1 x 600 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1 x 900 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1 x 73.2 GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1 x 146.5 GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1 x 300GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-331
	SATA	**160GB HDD** 1 x 160 GB, 2.5-inch, SATA2, 7,200 rpm	N8150-276
		500GB HDD 1 x 500 GB, 2.5-inch, SATA2, 7,200 rpm	N8150-277
		1TB HDD 1 x 1 TB, 2.5-inch, SATA2, 7,200 rpm	N8150-334
	SSD	**50GB SSD** 1 x 50 GB, 2.5-inch, SATA2	N8150-702
		100GB SSD 1 x 100 GB, 2.5-inch, SATA2	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- SAS and SATA hard drives must be installed in separate HDD Cages.

4.2.4 2.5-inch Drives with RAID 5/6 Controller with 512 MB Cache

Category		Product Name / Description	Part Number
Storage Controller Required		**RAID Controller (512MB, RAID0/1/5/6)** Promise SuperTrak EX8760T-512 RAID 0/1/5/6, 512MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 3Gb/s, LP / FH	N8103-134
RAID BBU Recommended		**RAID Battery Backup Unit** for Promise SuperTrak EX8760T and EX8768	N8103-136
Cable		**Internal SAS/SATA Cable** 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
HDD Cage		**2.5-inch HDD Cage** 6 x 2.5-inch hot plug hard drive bays	(Standard)
HDD 6 slots available	**SAS**	**146.5GB HDD** 1 x 146.5 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-300
		300GB HDD 1 x 300 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-301
		450GB HDD 1 x 450 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-322
		600GB HDD 1 x 600 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-304
		900GB HDD 1 x 900 GB, 2.5-inch, SAS 6Gb/s, 10,000 rpm	N8150-332
		73.2GB HDD 1 x 73.2 GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-302
		146.5GB HDD 1 x 146.5 GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-303
		300GB HDD 1 x 300GB, 2.5-inch, SAS 6Gb/s, 15,000 rpm	N8150-331
	SATA	**160GB HDD** 1 x 160 GB, 2.5-inch, SATA2, 7,200 rpm	N8150-276
		500GB HDD 1 x 500 GB, 2.5-inch, SATA2, 7,200 rpm	N8150-277
		1TB HDD 1 x 1 TB, 2.5-inch, SATA2, 7,200 rpm	N8150-334
	SSD	**50GB SSD** 1 x 50 GB, 2.5-inch, SATA2	N8150-702
		100GB SSD 1 x 100 GB, 2.5-inch, SATA2	N8150-707

NOTE:

- All hard drives within a RAID array should be of the same capacity and rotation speed.
- SAS and SATA hard drives must be installed in separate HDD Cages.

4.2.5 3.5-inch Drives with On-board SATA Controller

Category	Product Name / Description	Part Number
Storage Controller	**On-board SATA Controller** 4 x SATA ports	(Standard)
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 3 x single-SATA	(Standard)
HDD Cage	**3.5-inch HDD Cage** 3 x 3.5-inch hot plug hard drive bays	(Standard)
HDD **3 slots available**	**250GB HDD** 1 x 250 GB, 3.5-inch, SATA2, 7,200 rpm	N8150-209A
	500GB HDD 1 x 500 GB, 3.5-inch, SATA2, 7,200 rpm	N8150-274
	1TB HDD 1 x 1 TB, 3.5-inch, SATA2, 7,200 rpm	N8150-263
	2TB HDD 1 x 2 TB, 3.5-inch, SATA2, 7,200 rpm	N8150-278

NOTE:

- On-board SATA RAID controller is supported only on Windows operating systems. An optional RAID controller is required to configure RAID array for other operating systems.
- On-board SATA RAID Controller does not support RAID 10 configured with 2TB HDDs.
- Hot plug insertion/removal is not supported with the on-board SATA non-RAID controller.
- All hard drives within a RAID array should be of the same capacity.

4.2.6 3.5-inch Drives with RAID Controller RAID 0/1/10, 256 MB Cache

Category	Product Name / Description	Part Number
Storage Controller **Required**	**RAID Controller (256MB, RAID 0/1)** LSI MegaRAID SAS 9264-8i RAID 0/1, 256MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 3Gb/s, LP / FH	N8103-129
RAID BBU **Recommended**	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9264	N8103-124
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 3 x single-SATA	(Standard)
HDD Cage	**3.5-inch HDD Cage** 3 x 3.5-inch hot plug hard drive bays	(Standard)
HDD **3 slots available**	**250GB HDD** 1 x 250 GB, 3.5-inch, SATA2, 7,200 rpm	N8150-209A
	500GB HDD 1 x 500 GB, 3.5-inch, SATA2, 7,200 rpm	N8150-274
	1TB HDD 1 x 1 TB, 3.5-inch, SATA2, 7,200 rpm	N8150-263
	2TB HDD 1 x 2 TB, 3.5-inch, SATA2, 7,200 rpm	N8150-278

NOTE:

- All hard drives within a RAID array should be of the same capacity.

4.2.7 3.5-inch Drives with RAID 5/6 Controller with 256 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (256MB, RAID 0/1/5/6)** LSI MegaRAID SAS 9264-8i RAID 0/1, 256MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 3Gb/s, LP / FH	N8103-130
RAID BBU Recommended	**RAID Battery Backup Unit** for LSI MegaRAID SAS 9264	N8103-124
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 3 x single-SATA	(Standard)
HDD Cage	**3.5-inch HDD Cage** 3 x 3.5-inch hot plug hard drive bays	(Standard)
HDD 3 slots available	**250GB HDD** 1 x 250 GB, 3.5-inch, SATA2, 7,200 rpm	N8150-209A
	500GB HDD 1 x 500 GB, 3.5-inch, SATA2, 7,200 rpm	N8150-274
	1TB HDD 1 x 1 TB, 3.5-inch, SATA2, 7,200 rpm	N8150-263
	2TB HDD 1 x 2 TB, 3.5-inch, SATA2, 7,200 rpm	N8150-278

NOTE:

- All hard drives within a RAID array should be of the same capacity.

4.2.8 3.5-inch Drives with RAID 5/6 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	**RAID Controller (512MB, RAID0/1/5/6)** Promise SuperTrak EX8760T-512 RAID 0/1/5/6, 512MB, Int. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 3Gb/s, LP / FH	N8103-134
RAID BBU Recommended	**RAID Battery Backup Unit** for Promise SuperTrak EX8760T and EX8768 **NOTE:** Either N8151-92 Internal USB FDD or N8103-137 RAID Battery Backup Unit can be installed in 3.5-inch drive models.	N8103-137
Cable	**Internal SAS/SATA Cable** 1 x mini-SAS to 3 x single-SATA	(Standard)
HDD Cage	**3.5-inch HDD Cage** 3 x 3.5-inch hot plug hard drive bays	(Standard)
HDD 3 slots available	**250GB HDD** 1 x 250 GB, 3.5-inch, SATA2, 7,200 rpm	N8150-209A
	500GB HDD 1 x 500 GB, 3.5-inch, SATA2, 7,200 rpm	N8150-274
	1TB HDD 1 x 1 TB, 3.5-inch, SATA2, 7,200 rpm	N8150-263
	2TB HDD 1 x 2 TB, 3.5-inch, SATA2, 7,200 rpm	N8150-278

NOTE:

- All hard drives within a RAID array should be of the same capacity.

5 Optical Drive

Category	Product Name / Description	Part Number
Internal **1 slot available**	**Internal Slim DVD-ROM drive** Slim DVD-ROM drive	N8151-100
	Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software	N8151-104F
External	**External DVD-ROM drive** Slim DVD-ROM drive, Bus powered, 0.8 A required	N8160-85

NOTE:

- Up to 1 optical drive can be connected.

6 Floppy Drive / Flash FDD

Category		Product Name / Description	Part Number
Internal **1 bay available in 3.5-inch HDD Model**	**Drive**	**Internal USB FDD** 2 mode **NOTE:** Either N8151-92 Internal USB FDD or N8103-137 RAID Battery Backup Unit can be installed in 3.5-inch drive models.	N8151-92
	Cable	**Internal USB Cable** 1 x USB-FDD cable	K410-193(00)
External		**Flash FDD** USB flash emulating USB floppy disk, Native capacity 1.44 MB **NOTE:** Flash FDD cannot be shipped to Taiwan and Korea.	N8160-86

NOTE:

- Up to 1 drive can be connected.

7 PCI Riser Card / PCI Card

7.1 PCI Riser Card

Product Name / Description	Part Number
Riser Card 1 x PCIe 2.0 x16, 1 x PCIe 2.0 x8	(Standard)
Riser Card (PCI-X) 1 x PCIe 2.0 x8, 1 x 64-bit / 133 MHz PCI-X	N8116-23

7.2 LAN Controller

Category		Product Name / Description	Part Number
GbE	**PCIe**	**1000BASE-T Adapter** Intel® PRO/1000 PT Server Adapter PCIe x1, LP / FH	N8104-126
		1000BASE-T Adapter (2ch) Intel® PRO/1000 PT Dual Port Server Adapter PCIe x4, FH	N8104-121
		1000BASE-T Adapter (2ch) Intel® PRO/1000 PT Dual Port Server Adapter PCIe x4, LP	N8104-122
		1000BASE-T Adapter (4ch) Intel® PRO/1000 PT Quad Port Server Adapter PCIe x4, LP / FH **NOTE:** Network cables with RJ-45 plug covers cannot be used.	N8104-125A
	PCI-X	**1000BASE-T Adapter** Intel® PRO/1000 MT Server Adapter 64bit / 133 MHz PCI-X, FH	N8104-119
		1000BASE-T Adapter (2ch) Intel® PRO/1000 MT Dual Port Server Adapter 64bit / 133 MHz PCI-X, FH	N8104-120
		1000BASE-SX Adapter Intel® PRO/1000 MF Server Adapter 64bit / 133 MHz PCI-X, FH	N8104-112
10GbE	**Ctrlr**	**10GBASE-SR Adapter** Chelsio S310E-SR 10GbE Storage Accelerator PCIe x8, LP / FH	N8104-123A
		10GBASE Adapter (SFP+/2ch) Broadcom NetXtreme II BCM957711 10G SFP+ Dual Port Network Interface Card PCIe 2.0 x8, LP / FH **NOTE**: - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to two SFP+ Modules can be installed. - One adapter can be installed in Red Hat Linux 6.x operating systems. - On Windows Server 2003R2 /2008 / 2008R2 and Red Hat Linux 5.x(EM64T) and 6.x(x86_64) operating systems, teaming and bonding features across one or two identical adapters are supported. A team can include up to two ports and up to two teams per system are allowed. - On Red Hat Linux 5.x(x86) and 6.x(x86) operating systems, bonding features within one adapter with up to two ports are supported. One team per system is allowed.	N8104-128
	Module	**SFP+ Module (10G-SR)** 1 x SFP+ Module for N8104-128	N8104-129
Converged Network		**Dual Port 10Gb Converged Network Adapter** BROCADE 1020 Dual Port 10Gbps Converged Network Adapter PCIe 2.0 x8, LP / FH, 2 x SFP module	N8104-131

NOTE:

- Teaming and bonding features across the standard LAN and optional PCIe based GbE LAN controller (excluding N8104-126) are supported on Windows Server 2003R2 /2008 / 2008R2 and Red Hat Linux 5.x operating systems.
- When installing a 10GBASE-SR Adapter, no other additional 10GbE LAN controllers is allowed.
- When installing a 1000BASE-SX Adapter, no other additional GbE LAN controller is allowed.
- Teaming feature is not supported on iSCSI interfaces.

7.3 External RAID Controller

Category		Product Name / Description	Part Number
Controller		**RAID Controller (512MB, RAID0/1/5/6)** Promise SuperTrak EX8768 RAID 0/1/5/6, 512MB, Ext. 8, PCIe 2.0 x8, SAS 6Gb/s, SATA 3Gb/s, LP / FH	N8103-135
RAID BBU	**2.5-inch Drive**	**RAID Battery Backup Unit** for Promise SuperTrak EX8760T and EX8768	N8103-136
	3.5-inch Drive	**RAID Battery Backup Unit** for Promise SuperTrak EX8760T and EX8768 **NOTE:** Either N8151-92 Internal USB FDD or N8103-137 RAID Battery Backup Unit can be installed in 3.5-inch drive models.	N8103-137

7.4 Fibre Channel / SAS / SCSI Controller

Category	Product Name / Description	Part Number
Fibre Channel	**Fibre Channel Controller (1ch)** Emulex LightPulse LPe1250-F8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8, LP / FH	N8190-153
	Fibre Channel Controller (2ch) Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8, LP / FH	N8190-154
	Fibre Channel Controller (1ch) Emulex LightPulse LPe1150-F4 Host Bus Adapter 4Gb/s, Optical, PCIe x4, LP / FH	N8190-127
	Fibre Channel Controller (2ch) Emulex LightPulse LPe11002-M4 Host Bus Adapter 4Gb/s, Optical, PCIe 2.0 x8, LP / FH	N8190-131
SCSI	**SCSI Controller** Adaptec SCSI Card 29320LPE 1-channel U320, 68-pin D-sub / 68-pin VHDC, PCIe x1, LP/FH	N8103-107
SAS	**SAS Controller** LSI SAS3442E-R Host Bus Adapter 3Gb/s SAS, Int. 4 / Ext. 4, SFF-8484 / SFF8470, PCIe x8, LP/FH	N8103-104A
	SAS Controller LSI SAS9212-4i4 Host Bus Adapter 6Gb/s SAS, Int. 4 / Ext. 4, 7-pin SATA / SFF-8088, PCIe 2.0 x8, LP/FH	N8103-142

7.5 Serial Port Adapter

Product Name / Description	Part Number
Serial Port Adapter Serial port fixed to PCI bracket	N8117-01A

8 Other Add-in Components

8.1 Redundant Power Supply

Product Name / Description	Part Number
Power Unit 1 x 650 Watt 80 PLUS® Gold certified Hot plug Power Supply	N8181-76F

8.2 VMware ESXi Pre-install Kit

Product Name / Description	Part Number
VMware ESXi 4.1 Base Kit Including USB flash memory, VMware ESXi 4.1 Recovery CD **NOTE:** The Base Kit may not be available in some regions. Please contact our sales representative to confirm if it is available in your country. The Base Kit must be ordered with the base model. Installation of VMware ESXi onto hard drives is not supported.	N8106-004F

9 Add-on Components

9.1 17-inch LCD Console Drawer

Category		Product Name / Description	Part Number
Drawer w/ KVM	**Drawer**	**17inch LCD Console Unit (1U/8port)** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-69F
	Cable	**Switch Unit Connection Cable Set (USB, 1.8m)** 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB, 3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB, 5m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
		Switch Unit Connection Cable Set (PS/2, 1.8m) 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 2 x 6-pin mini DIN	K410-119(1A)
		Switch Unit Connection Cable Set (PS/2, 3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 2 x 6-pin mini DIN	K410-119(03)
		Switch Unit Connection Cable Set (PS/2, 5m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 2 x 6-pin mini DIN	K410-119(05)
Drawer w/o KVM	**Drawer**	**17inch LCD Console Unit 1U** 17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height, 4-pin USB B to 4-pin USB A cable 2m, PS/2 Y-splitter cable 2m, 15-pin mini D-sub VGA cable 2m	N8143-76F

9.2 KVM Switch

Category	Product Name / Description	Part Number
KVM Switch	**Server Switch Unit (8 server)** 1U USB 8 port KVM switch	N8191-10F
Cable	**Switch Unit Connection Cable Set (USB,1.8m)** 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
	Switch Unit Connection Cable Set (USB,3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
	Switch Unit Connection Cable Set (USB,3m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
	Switch Unit Connection Cable Set (PS/2, 1.8m) 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 2 x 6-pin mini DIN	K410-119(1A)
	Switch Unit Connection Cable Set (PS/2, 3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 2 x 6-pin mini DIN	K410-119(03)
	Switch Unit Connection Cable Set (PS/2, 5m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 2 x 6-pin mini DIN	K410-119(05)

9.3 Server Management License

The server integrates the EXPRESSSCOPE Engine 2 as standard. Refer to **Server Management** for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

Product Name / Description	Part Number
Remote KVM and Media License Kit License for one server. Remote KVM and remote media are enabled regardless of OS status. Remote KVM: - Displays a graphics console on the web browser of the remote terminal (PC/server). - Controls keyboard and mouse via the remote terminals' web browser Remote media: Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives. **NOTE:** Remote KVM and remote media features are not available for virtual machines.	N8115-03

9.4 Front Bezel

Product Name / Description	Part Number
Front Bezel Front bezel for R120b-1	N8146-18F

9.1 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm For R120b-1 / R120b-1	N8143-70

10 Support Service

10.1 Software

Product Name / Description	Part Number
PP Support Pack (VMware ESXi 4.1 for 1 processor)(1year) Technical Support Service regarding ESXi (for quick solutions to technical issues) **NOTE:** It is necessary to purchase a PP support pack for each processor installed in the system.	ULH1S-SV40-008F

References

Server Management

The EXPRESSSCOPE Engine 2, integrated into the server, provides superior remote control and system management features listed in the table below.

		Standard	With Remote KVM and Media License kit
Hardware monitoring	Temperature/voltage/power/ fan /degeneration (memory/hard drive)	✓	✓
	Hardware event log collection	✓	✓
Boot monitoring	Booting, BIOS/POST stall, OS stall, shutdown	✓[1]	✓[1]
Alerting	HW error, Boot error and OS panic (by SNMP, E-Mail)	✓	✓
Remote console (via LAN)	POST/BIOS setup, DOS utility	✓[2]	✓
	Panic screen, Boot screen	✓[2]	✓
	Text-based screen (OS console)	✓[2]	✓
	GUI-based screen (OS console)	-	✓
Remote control (via LAN)	Remote reset/power on-off/ dump	✓	✓
	OS shutdown	✓[1]	✓[1]
	Remote media (CD/DVD/FD)	-	✓
	Server Management Command Line Protocol (DMTF compliant)	✓	✓
	Remote control via Web browser (without dedicated app)	✓	✓
	Remote batch	✓[1]	✓[1]
	Scheduling (without UPS)	✓[1]	✓[1]
Others	Set automatic IP address via DNS/DHCP	✓	✓
Remote wakeup	Wake On LAN, Wake On Ring	✓	✓
Centralized management	Monitoring and control of multiple servers	✓[1]	✓[1]
Industry standard	IPMI	2.0	2.0

[1] The feature is not supported on VMware ESXi systems.

[2] The standard serial port is not available for the feature.

OS Support Matrix for PCI Cards

Part number	Product Name	WS 2008R2	WS 2008	WS 2008 x64	WS 2003R2	WS 2003R2 x64	WS 2003	RHEL 6	RHEL 6 x64	RHEL 5	RHEL 5 x64	RHEL 4	RHEL 4 x64	SLES 11 x64	SLES 10	SLES 10 x64	ESXi 4.1
N8103-129	RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-130	RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-134	RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓
N8103-135	RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓
N8103-107	SCSI Controller	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	-	-	-
N8103-104A	SAS Controller, 3 Gb/s	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	-
N8103-142	SAS Controller, 6 Gb/s	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	-	-	-	-
N8190-127	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	-	✓	✓	✓
N8190-131	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	-	✓	✓	✓
N8190-153	Fibre Channel Controller	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	-	-	-	✓
N8190-154	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	✓	-	-	✓	✓	-	-	-	-	-	✓
N8104-126	1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-121	1000BASE-T Adapter (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-122	1000BASE-T Adapter (2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-125A	1000BASE-T Adapter (4ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓
N8104-123A	10GBASE-SR Adapter	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-
N8104-128	10GBASE Adapter (SFP+/2ch)	✓	✓	✓	-	-	-	✓	✓	✓	✓	-	-	-	-	-	✓
N8104-119	1000BASE-T Adapter	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓
N8104-120	1000BASE-T Adapter (2ch)	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓
N8104-112	1000BASE-SX Adapter	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
N8104-131	Dual Port 10Gb Converged Network Adapter	✓	✓	✓	-	-	-	-	-	✓	✓	-	-	-	-	-	-

Supporting PCI Cards and Installable Slots

Standard Riser Card

Part Number	Product Name	Slots			Remarks
	Slot # :	#0A	#1B	#1C	
	PCI Slot:	x4	x16	x8	
	Card height:	-	FH	LP	
	Slot type:	x8	x16	x8	
	Installable card length (mm) :	-	175	167	
N8103-129	RAID Controller (256MB, RAID 0/1) [PCIe 2.0 x8]	✓	-	-	
N8103-130	RAID Controller (256MB, RAID 0/1/5/6) [PCIe 2.0 x8]	✓	-	-	
N8103-134	RAID Controller (512MB,RAID 0/1/5/6) [PCIe 2.0 x8]	✓	-	-	
N8103-135	RAID Controller (512MB,RAID 0/1/5/6) [PCIe 2.0 x8]	-	✓	✓	
N8103-107	SCSI Controller [PCIe x1]	-	✓	✓	
N8103-104A	SAS Controller [PCIe x8]	-	✓	✓	
N8103-142	SAS Controller [PCIe 2.0 x8]	-	✓	✓	
N8190-127	Fibre Channel Controller [PCIe x4]	-	✓	✓	
N8190-131	Fibre Channel Controller (2ch) [PCIe x4]	-	✓	✓	
N8190-153	Fibre Channel Controller [PCIe 2.0 x8]	-	✓	✓	
N8190-154	Fibre Channel Controller (2ch) [PCIe 2.0 x8]	-	✓	✓	
N8104-126	1000BASE-T adapter [PCIe x1]	-	✓	✓	
N8104-121	1000BASE-T Adapter (2ch) [PCIe x4]	-	✓	-	
N8104-122	1000BASE-T Adapter (2ch) [PCIe x4]	-	-	✓	
N8104-125A	1000BASE-T Adapter (4ch) [PCIe x4]	-	✓	✓	
N8104-123A	10GBASE-SR Adapter [PCIe x8]	-	✓	✓	
N8104-128	10GBASE adapter (SFP+/2ch) [PCIe 2.0 x8]	-	✓	✓	
N8104-131	Dual Port 10Gb Converged Network Adapter [PCIe 2.0 x8]	-	✓	✓	
N8117-01A	Serial Port Adapter	-	-	✓	

N8116-23 Riser Card (PCI-X)

Part Number	Product Name	Slots			Remarks
	Slot # :	#0A	#1B	#1C	
	PCI Slot:	x4	64-bit	x8	
	Card height:	-	FH	LP	
	Slot type:	x8	3.3 V	x8	
	Installable card length (mm) :	-	175	167	
N8103-129	RAID Controller (256MB, RAID 0/1) [PCIe 2.0 x8]	✓	-	-	
N8103-130	RAID Controller (256MB, RAID 0/1/5/6) [PCIe 2.0 x8]	✓	-	-	
N8103-134	RAID Controller (512MB,RAID 0/1/5/6) [PCIe 2.0 x8]	✓	-	-	
N8103-135	RAID Controller (512MB,RAID 0/1/5/6) [PCIe 2.0 x8]	-	-	✓	
N8103-107	SCSI Controller [PCIe x1]	-	-	✓	
N8103-104A	SAS Controller [PCIe x8]	-	-	✓	
N8103-142	SAS Controller [PCIe 2.0 x8]	-	-	✓	
N8190-127	Fibre Channel Controller [PCIe x4]	-	-	✓	
N8190-131	Fibre Channel Controller (2ch) [PCIe x4]	-	-	✓	
N8190-153	Fibre Channel Controller [PCIe2.0 x8]	-	-	✓	
N8190-154	Fibre Channel Controller(2ch) [PCIe2.0 x8]	-	-	✓	
N8104-119	100BASE-T Adapter [64-bit / 133 MHz PCI-X]	-	✓	-	
N8104-120	100BASE-T Adapter(2ch) [64-bit / 133 MHz PCI-X]	-	✓	-	
N8104-126	1000BASE-T Adapter [PCIe x1]	-	-	✓	
N8104-122	1000BASE-T Adapter(2ch) [PCIe x4]	-	-	✓	
N8104-125A	1000BASE-T Adapter(4ch) [PCIe x4]	-	-	✓	
N8104-112	1000BASE-SX adapter [64-bit / 133 MHz PCI-X]	-	✓	-	
N8104-123A	10GBASE-SR adapter [PCIe x8]	-	-	✓	
N8104-128	10GBASE adapter (SFP+/2ch) [PCIe2.0 x8]	-	-	✓	
N8104-131	Dual Port 10Gb Converged Network Adapter [PCIe 2.0 x8]	-	-	✓	
N8117-01A	Serial Port Adapter	-	-	✓	

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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

Revision History

Revision	Date	Description
5.2	September 15, 2011	**Others:** Correct incorrect part numbers for 50 GB SSD, PS/2 Switch Unit Connection Cable Set. Correct incorrect information in Specification and 9.1 17-inch LCD Console Drawer.
5.1	August 26, 2011	**Others:** Add the note for the on-board SATA controller
5.0	July 29th, 2011	**New products added:** 300GB 15K 2.5-inch SAS HDD / N8150-331 900GB 10K 2.5-inch SAS HDD / N8150-332 **Discontinued products removed:** SCSI Controller / N8103-75 100BASE-TX Adapter / N8104-111
4.0	June 6th, 2011	**New product added:** Internal DVD Super Multi Drive / N8151-104F
3.0	April 8th, 2011	**New products added:** 1TB 7.2K 2.5-inch SATA HDD / N8150-334
2.0	February 16th, 2011	**Others:** 50GB SSD is re-added.
1.0	February 14th, 2011	Initial release